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U. S. DEPARTMENT OF AGRICULTURE FOREST SERVICE FOREST PRODUCTS LABORATORY MADISON, WIS.

In Cooperation with the University of Wisconsin

LIST OF PUBLICATIONS ON

DRYING OF WOOD

This list includes publications that present the results of research by the Forest Products Laboratory in this particular field of wood products research.

Single copies of the various items may be obtained free upon request from the Director, Forest Products Laboratory, Post Office Box 5130, Madison, WI. 53705. Classroom quantities are not available because of limited printing and storage facilities.

Title	Author	Publication and date
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PHYSICAL PROPERTIES OF WOOD RELATED TO DRYING

A. Permeability and Diffusion

Directional permeability of softwoods.	Comstock, G. L.	Wood and Fiber 1(4): 283-289. 1970.
Relationship between permeability of green and dry eastern hemlock.	Comstock, G. L.	Forest Prod. J. 18(8): 20-23. Aug. 1968.

Title	Author	Publication and date
Factors affecting permeability and pit aspiration in coniferous sapwood.	Comstock, G. L. & Côté, W. A.	Wood Sci. and Tech. 2: 279-291. 1968.
Longitudinal permeability of green eastern hemlock.	Comstock, G. L.	Forest Prod. J. 15(10): 441-449. Oct. 1965.

B. Shrinkage and Swelling

Longitudinal shrinkage in seven species of wood.	Hann, R. A.	U.S. Forest Serv. Res. Note FPL-0203. 1969.
Effect of restrained swelling on wood moisture content.	Simpson, W. T. & Skaar, C.	U.S. Forest Serv. Res. Note FPL-0196. 1968.
Effect of transverse compressive stress on loss of wood.	Simpson, W. T. & Skaar, C.	U.S. Forest Serv. Res. Note FPL-0197. 1968.
Thermodynamics of water sorption by wood.	Skaar, C. & Simpson, W. T.	Forest Prod. J. 18(7): 49-58. July 1968.
Dimensional changes in kiln-dried softwood lumber after surfacing and during storage.	Comstock, G. L.	U.S. Forest Serv. Res. Note FPL-0144. 1966.
Shrinkage of coast-type Douglas-fir and old-growth redwood boards.	Comstock, G. L.	U.S. Forest Serv. Res. Pap. FPL 30. 1965.

C. Moisture Content

Equilibrium moisture content prediction for wood.	Simpson, W. T.	Forest Prod. J. 21(5): 48,49. May 1971.
Effect of temperature on readings of electric moisture meters.	James, W. L.	Forest Prod. J. 18(10): 23-31. Oct. 1968.
Effects of wood preservatives on electrical moisture meter readings.	James, W. L.	U.S. Forest Serv. Res. Note FPL-0106. 1966.

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C. Moisture Content--Continued

A probe for accurate determination of moisture content of wood products in use.	Duff, John E.	U.S. Forest Serv. Res. Note FPL-0142. 1966.
Calibration of electric moisture meters for some wood species grown in Hawaii.	James, W. L.	U.S. Forest Serv. Res. Note FPL-061. 1964.
Kiln samples (ch. 6, Dry Kiln Operator's Manual)		(See Kiln Drying of Lumber)
Wood Properties in relation to drying. (ch. 2, Air Drying of Lumber)		(See Air Drying Treatments)

D. Stresses

Honeycomb and ring failure in bacterially infected red oak lumber after kiln drying.	Ward, J. C., Hann, R. A., Baltes, R. C., & Bulgrin, E. H.	U.S. Forest Serv. Res. Pap. FPL 165. 1972.
Seasoning factors for modulus of elasticity and modulus of rupture.	Gerhards, C. C.	Forest Prod. J. 18(11): 27-35. Nov. 1968.
Transverse strain during drying of 2-inch ponderosa pine.	McMillen, J. M.	U.S. Forest Serv. Res. Pap. FPL 83. 1968.
Tensile, compressive, and shearing stresses developed in red oak as it dries.	Youngs, R. L. & Bendtsen, B. A.	Forest Prod. J. 14(3): 113-118. Mar. 1964.

E. Other Problems Related to Drying

List of manufacturers and dealers for log and lumber end coatings that reduce checking and splitting.		FPL Rep. 71-021. 1971.
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E. Other Problems Related to Drying--Continued

Gray-brown chemical stain in southern hardwoods.	Bois, P. J.	U.S. Forest Serv. FPU Tech. Rep. No. 1. 1970.
Dip treatment in polyethylene glycol not effective in preventing surface checking.	Rietz, R. C.	U.S. Forest Serv. Res. Note FPL-0204. 1969.
Prevention of pinkish-brown discoloration in drying maple sapwood.	McMillen, J. M.	U.S. Forest Serv. Res. Note FPL-0193. 1968.
Sun-following rack accelerates weathering of wood products.	Wengert, E. M. & Koster, A. L.	Solar Energy 12: 267-272. 1968.
Quality of studs kiln-dried by high and conventional temperatures.	Kimball, K. E. & Lowery, D. P.	Forest Prod. J. 17(9): 81-85. Sept. 1967.
Standard terms for describing wood.		U.S. Forest Serv. Res. Note FPL-0171. 1967.
Comparative strength of air-dried and kiln-dried wood.		U.S. Forest Serv. Res. Note FPL-055. 1964.
Characteristics of Alaska wood.		U.S. Forest Serv. Res. Pap. FPL 1. 1964.

VARIOUS METHODS OF DRYING LUMBER

Air Drying

A calendar for air-drying lumber in the upper Midwest.	Rietz, R. C.	U.S. Forest Serv. Res. Note FPL-0224. 1972.
Air drying of lumber: A guide to industry practices.	Rietz, R. C. & Page, H.	USDA Agr. Handb. No. 402. 110 pp. 1971. (Copies may be purchased from the Superintendent of Documents, GPO, Washington, D.C. 20402. Price - \$1.00)

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Air Drying--Continued

Air-drying lumber in stickered packages.	Rietz, R. C.	So. Lbrmn. 221(2752): 99-103. Dec. 15, 1970.
Air drying lumber in a fork-lift yard.	Rietz, R. C.	U.S. Forest Serv. Res. Note FPL-0209. 1970.
The air-drying of southern hardwoods.	Rietz, R. C.	So. Lbrmn. 210(2617): 19-20. May 1, 1965.
A method of seasoning small quantities of lumber.	Rasmussen, E. F.	U.S. Forest Serv. Res. Note FPL-089. 1965.

Kiln Drying

Schedules for foreign woods.	McMillen, J. M. & Bois, P. J.	U.S. Forest Serv. FPU Tech. Rep. No. 2. March 1972.
Review of high-temperature kiln-drying of hardwoods.	Wengert, E. M.	So. Lbrmn. 17-19. Sept. 15, 1972.
New kiln schedule for pre-surfaced oak lumber.	McMillen, J. M. & Baltes, R. C.	Forest Prod. J. 22(5): 19-26. May 1972.
Accelerated oak drying by presurfacing, accelerated schedules, and kiln automation.	Wengert, E. M. & Baltes, R. C.	U.S. Forest Serv. Res. Note FPL-0214. 1971.
Dry kiln automation.	Wengert, E. M.	So. Lbrmn. Dec. 15, 1971.
Automatic programing and control for steam-heated lumber dry kilns.	Wengert, E. M. & Evans, P. G.	Forest Prod. J. 21(2): 56-59. 1971.
Improvements in solar dry kiln design.	Wengert, E. M.	U.S. Forest Serv. Res. Note FPL-0212. 1971.
Partial list of lumber dry kiln manufacturers in the United States.		FPL Rep. 71-014. 1971.

Title	Author	Publication and date
<u>Kiln Drying--Continued</u>		
Accelerating the kiln drying of hardwoods.	: Rietz, R. C.	: So. Lbrmn. 221(2741): : 19-22, 26, 27, 30. : July 1, 1970.
Properties of imported tropical woods. (Kiln schedules included.)	: Kukachka, B. F.	: U.S. Forest Serv. Res. : Pap. FPL 125. 1970.
Computer programmed kiln controls expected to save time and money.	: Wengert, E. M.	: Wood & Wood Products. : Mar. 1970.
Accelerated kiln drying of presurfaced 1-inch northern red oak.	: McMillen, J. M.	: U.S. Forest Serv. Res. : Pap. FPL 122. 1969.
Influence of initial drying temperatures on the development of warp in 1-inch hard maple.	: Rietz, R. C.	: Forest Prod. J. 19(7): : 37-40. July 1969.
Producing check-free beech for turnings.	: Rietz, R. C. & : Jenson, J. A.	: Forest Prod. J. 18(11): : 42-44. Nov. 1968.
Seasoning and handling of ramín.	: McMillen, J. M.	: U.S. Forest Serv. Res. : Note FPL-0172. 1967.
Present methods of drying and conditioning wood for use.	: Youngs, R. L.	: Economic Bot. 21(1): : 46-50. Jan.-Mar. 1967.
Operation and maintenance of lumber dry kilns.		: U.S. Forest Serv. Res. : Note FPL-0118. 1966.
News and views of this kiln drying business: Pre-surfacing green oak lumber to reduce surface checking.	: Rietz, R. C. & : Jenson, J. A.	: U.S. Forest Serv. Res. : Note FPL-0146. 1966.
News and views of this kiln drying business: Warp reduction.		: U.S. Forest Serv. Res. : Note FPL-0108. 1965.
The kiln drying of wood.	: Rietz, R. C.	: Spec. Tech. Pub. No. : 385, pp. 38-51. 1965.

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Kiln Drying--Continued

Comparative strength of air-dried and kiln-dried wood.		: U.S. Forest Serv. Res. Note FPL-055. 1964.
Dry kiln operator's manual.	Rasmussen, E. F.	: USDA Agr. Handb. No. 188. 1961. (Copies may be obtained from the Superintendent of Documents, GPO, Washington, D.C. 20402. Price - \$1.50
Separates from Dry Kiln Operator's Manual.		: USDA Agr. Handb. No. 188. 1961. Individual copies of separates available from Forest Products Laboratory.
<u>Chapter</u>		
Introduction		
1. Properties of wood related to drying.		
2. Kiln types and features.		
3. Auxiliary kiln equipment.		
4. Inspection and maintenance of dry kilns.		
5. Stacking lumber and other items for kiln drying.		
6. Kiln samples.		
7. Loading the dry kiln.		
8. Kiln schedules and drying time.		
9. Drying defects.		
10. Operating a dry kiln.		
11. Storage of wood.		

Special Drying Methods

Salvaging flooded lumber.		: U.S. Forest Serv. FPU Tech. Rep. No. 5. April 1973.
A check list for drying small amounts of lumber.	Bois, P. J. & Wengert, E. M.	: U.S. Forest Serv. FPU Tech. Rep. No. 6. July 1973.

Title	Author	Publication and date
<u>Special Drying Methods--Continued</u>		
Enzyme mixture improves creosote treatment of kiln- dried Rocky Mountain Douglas-fir.	: Tschernitz, J. L.	: Forest Prod. J. 23(3): : 30-38. Mar. 1973.
Accelerating oak air drying by presurfacing.	: Simpson, W. T. & : Baltes, R. C.	: U.S. Forest Serv. Res. : Note FPL-0223. 1972.
Press drying nine species of wood.	: Hittmeier, M. E., : Comstock, G. L., : & Hann, R. A.	: Forest Prod. J. 18(9): : 91-96. Sept. 1968.
High-temperature drying of lumber--a review.	: Lowery, D. P., : Krier, J. P., & : Hann, R. A.	: U.S. Forest Serv. Res. : Pap. INT 48. 1968.
Accelerated methods of drying thick-sliced and thin-sawed loblolly pine.	: Kimball, K. E.	: Forest Prod. J. 18(1): : 31-38. Jan. 1968.
Quality of studs kiln dried by high and conventional temperatures.	: Kimball, K. E. & : Lowery, D. P.	: Forest Prod. J. 17(9): : 81-85. Sept. 1967.
High temperature and conven- tional temperature methods for drying lodgepole pine and western larch studs.	: Kimball, K. E. & : Lowery, D. P.	: Forest Prod. J. 17(4): : 32-40. Apr. 1967.
Methods for drying lodgepole pine and western larch.	: Kimball, K. E. : & Lowery, D. P.	: Forest Prod. J. 17(4): : 32-40. Apr. 1967.
Solar drying of tropical woods.	: Chudnoff, M., : Maldonado, E. D., : & Goytia, E.	: U.S. Forest Serv. Res. : Pap. ITF 2. 1966.
Paneling and flooring from low-grade hardwood logs. (Press-dried paneling.)	: Heebink, B. G. & : Compton, K. C.	: U.S. Forest Serv. Res. : Note FPL-0122. 1966.
Drying yellow-poplar at temperatures above 100° C.	: Hann, R. A.	: Forest Prod. J., pp. 215- : 220. May 1964.

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Special Drying Methods--Continued

Veneer cutting and drying properties:		
Western larch.		U.S. Forest Serv. Res. Note FPL-0163. 1967.
Tanoak.		U.S. Forest Serv. Res. Note FPL-0164. 1967.
Pacific madrone.		U.S. Forest Serv. Res. Note FPL-094. 1965.
Water oak.		U.S. Forest Serv. Res. Note FPL-0105. 1965.
Cottonwood.		U.S. Forest Serv. Res. Note FPL-044. 1964.
Tupelo.		U.S. Forest Serv. Res. Note FPL-017. 1963.

MOISTURE CONTENT AND TEMPERATURE CONTROL
DURING FABRICATION AND USE

Maintaining moisture content conditions during lumber storage.	Bois, P. J.	U.S. Forest Serv. FPU Tech. Rep. No. 3.
Equilibrium moisture prediction for wood.	Simpson, W. T.	Forest Prod. J. 21(5): 48. May 1971.
Moisture content of laminated timbers.	Hann, R. A., Oviatt, A. E., Markstrom, D. M., & Duff, J. E.	U.S. Forest Serv. Res. Pap. FPL 149. 1970.
Electrical analog approach to heat flow through wood-frame walls.	Wengert, E. M.	Forest Prod. J. 18(1): 99-101. Jan. 1968.
Drying and conditioning glued joints.		U.S. Forest Serv. Res. Note FPL-0190. 1968.
Moisture distribution in wood-frame walls in winter.	Duff, J. E.	Forest Prod. J. 18(1): 60-64. Jan. 1968.
An analog computer for predicting surface temperature of wood.	Wengert, E. M.	U.S. Forest Serv. Res. Note FPL-0171. Aug. 1967.

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MOISTURE CONTENT AND TEMPERATURE CONTROL
DURING FABRICATION AND USE--Continued

Parameters for predicting maximum surface temperatures of wood in exterior exposures.	: Wengert, E. M.	: U.S. Forest Serv. Res. Pap. FPL 62. May 1966.
Theoretical considerations in the drying of wood at pressures above atmospheric.	: Hann, R. A.	: Forest Prod. J. 16(4): 25-32. Apr. 1966.
Predicting maximum surface temperatures of wood in exterior exposures.	: Wengert, E. M.	: Forest Prod. J. 15(7): 263-268. July 1965.
Make your own low-cost controlled-humidity room.	: Heebink, B. G.	: Plywood Mag., pp. 24-26. Mid-February 1964.
Study of temperatures in wood parts of houses throughout the United States.	: Heyer, O. C.	: U.S. Forest Serv. Res. Note FPL-012. 1963.
Storage of wood.	: Rasmussen, E. F.	: Separate, Chapter 11 from "Dry Kiln Operator's Manual," USDA Agr. Handb. No. 188. 1961.

RELATED PUBLICATIONS

A look at and a result of reorganizing drying research at Forest Products Laboratory.	: Hann, R. A. & Ward, J. C.	: Presented at 23rd Annual Mtg. of Western Dry Kiln Clubs, May 8, 1972.
Electrical analog approach to heat flow through wood-walls.	: Wengert, E. M.	: Forest Prod. J. 18(1): 99-102. January 1968.
Wood-drying--techniques and economics.	: McMillen, J. M.	: So. Lbrmn. 208(2589): 25-26, 28, 32, 34. Feb. 15, 1964.

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RELATED PUBLICATIONS--Continued

How PEG helps the hobbyist who works with wood.	:	Mitchell, H. L.	:	FPL unnumbered report.
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U.S. Forest Products	:		:	U.S. Forest Serv. Res.
Laboratory notes on the treatment of wood with polyethylene glycol.	:		:	Note FPL-06. 1966.
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